

A method of modeling multiple material parts for additive manufacturing processes such direct metal deposition operates within the constraints of a single material CAD system. Each material is modeled separately as a single or multiple solid part, under the assumption that there are no internal multiple materials; that is, no voids for other material parts. The parts are ordered from the outer most geometry to the innermost geometry and Boolean operations are performed to calculate the final volume for each part. In use of the invention, should any design changes occur, only the parts as originally defined need to be modified, and the method is reapplied. The method is applicable to the generation of CAM cutting paths for 2½-D and 3-D geometries by pocket machining with spiral-in, spiral-out, and arbitrary direction raster tool paths using stock material with and without reflection, depending upon the geometry. Single- and multi-material files may be merged one toolpath file, and commands may be embedded for closed- or open-loop control of the fabrication process.